Risk of serious injury and death for drivers positive for drugs

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Risk of serious injury and death for drivers positive for drugs

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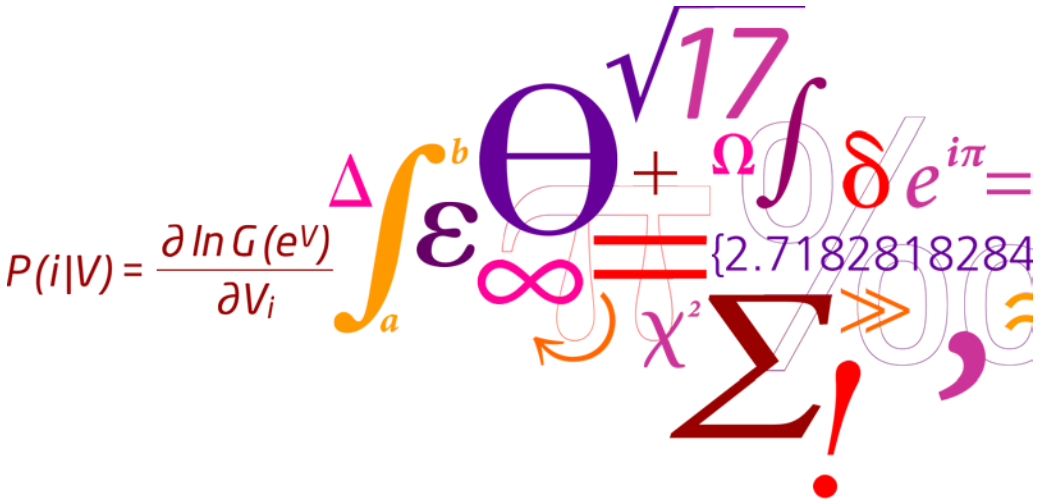


DTU Transport
Department of Transport

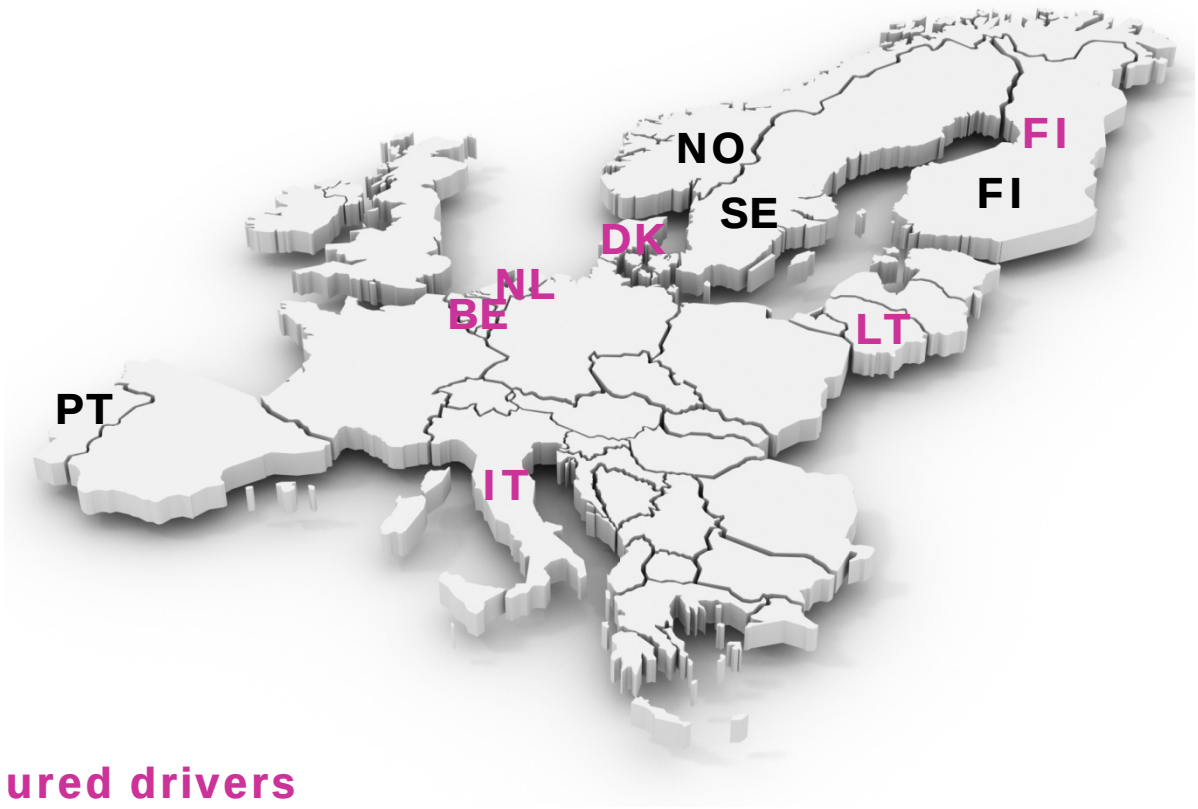
Case-control design

Cases I
Drivers of personal vehicles
Seriously injured (MAIS≥2)
Blood samples, N=2,490

Cases II
Drivers of personal vehicles
Killed in traffic
Blood samples, N=1,112

Controls
Drivers of personal vehicles
Stratified sample
Checked at random
Blood and saliva samples,
N= 15,832 (I)
N=21,917 (II)

Participating countries



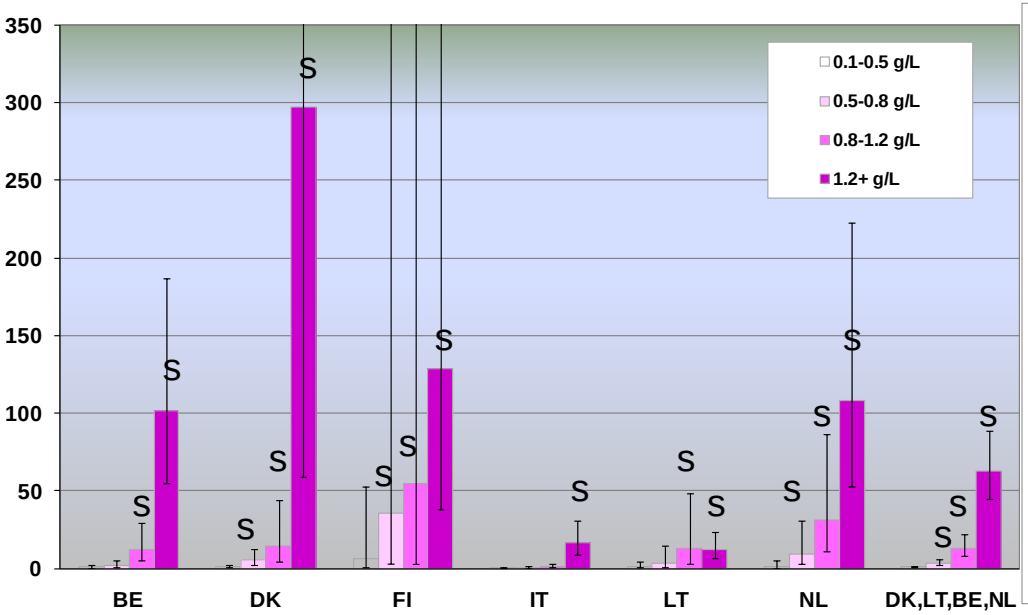
Injured drivers
Killed drivers

The following drugs were analysed for:

- Alcohol
- Illicit drugs
  - Amphetamines
  - Benzoylecgonine
  - Cocaine
  - Cannabis
  - Illicit opiates
- Medicinal drugs
  - Benzodiazepines/ z-drugs
  - Medicinal opioids

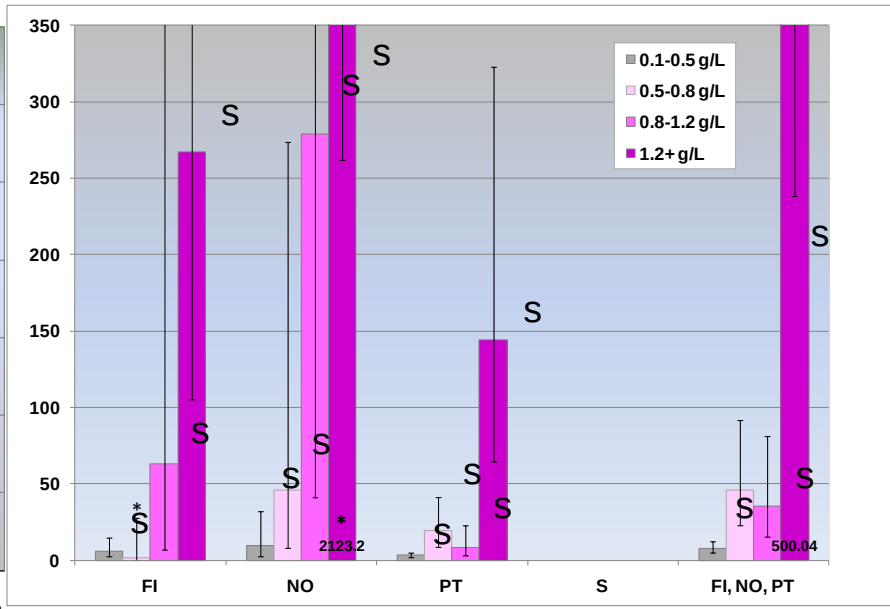
Alcohol – risk of getting injured (left) and killed (right)

OR



injured

OR

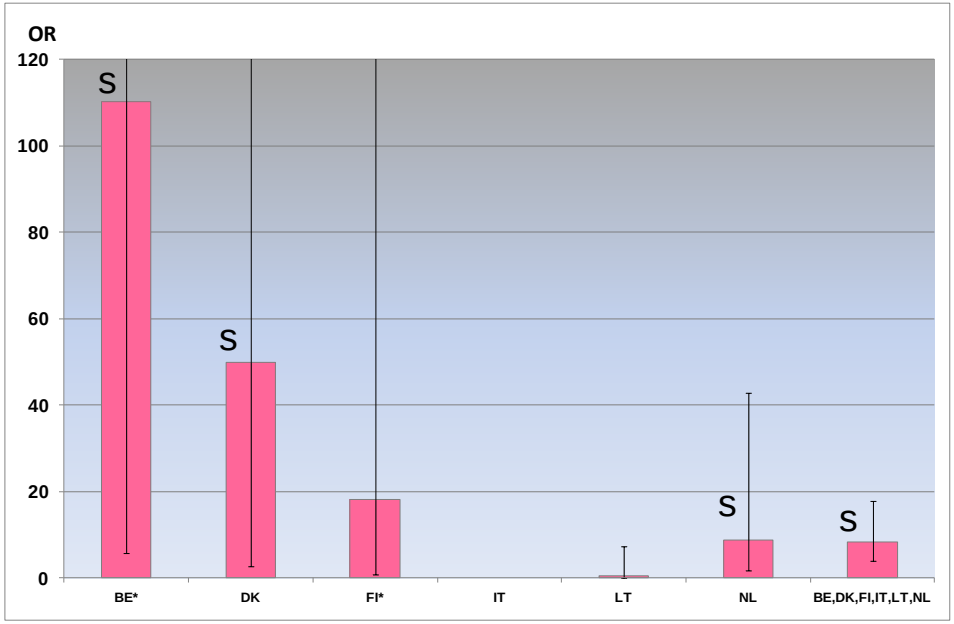


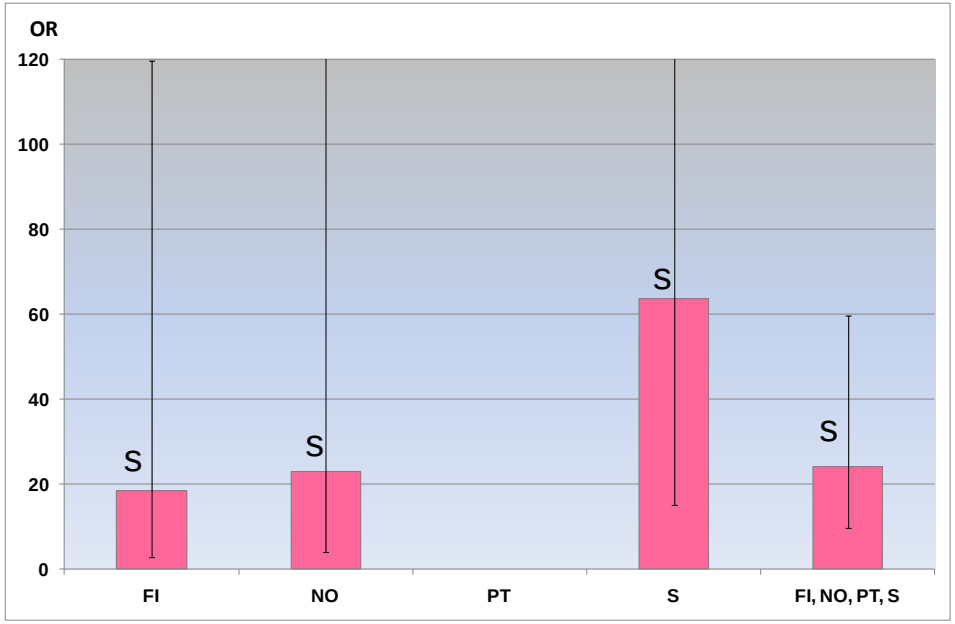
killed

Odds ratios adjusted for gender and age
** Crude odds ratios*

s: significantly above 1

Amphetamines – risk of getting injured (left) and killed (right)





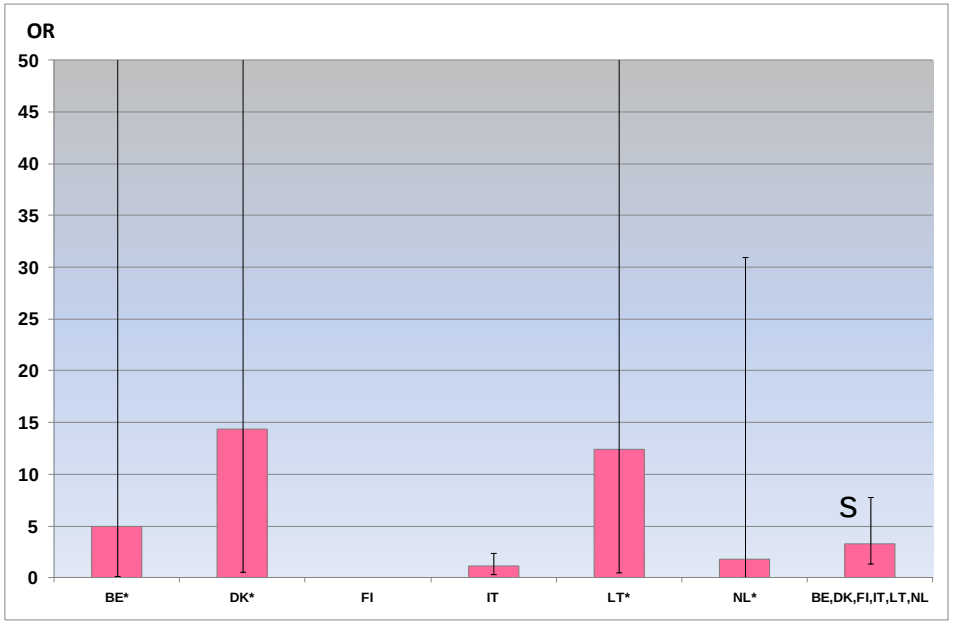
injured ***killed***

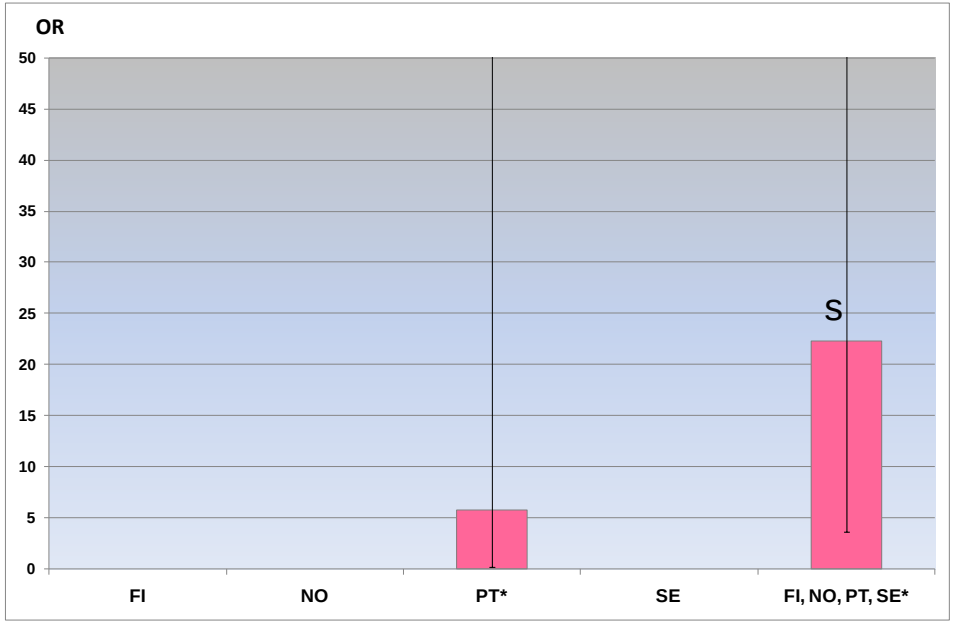
Odds ratios adjusted for gender and age *s: significantly above 1*

** Crude odds ratios*

Because of very different single country estimates, the aggregated risk estimates of injured and killed drivers positive for amphetamine should be handled with care.

Cocaine – risk of getting injured (left) and killed (right)





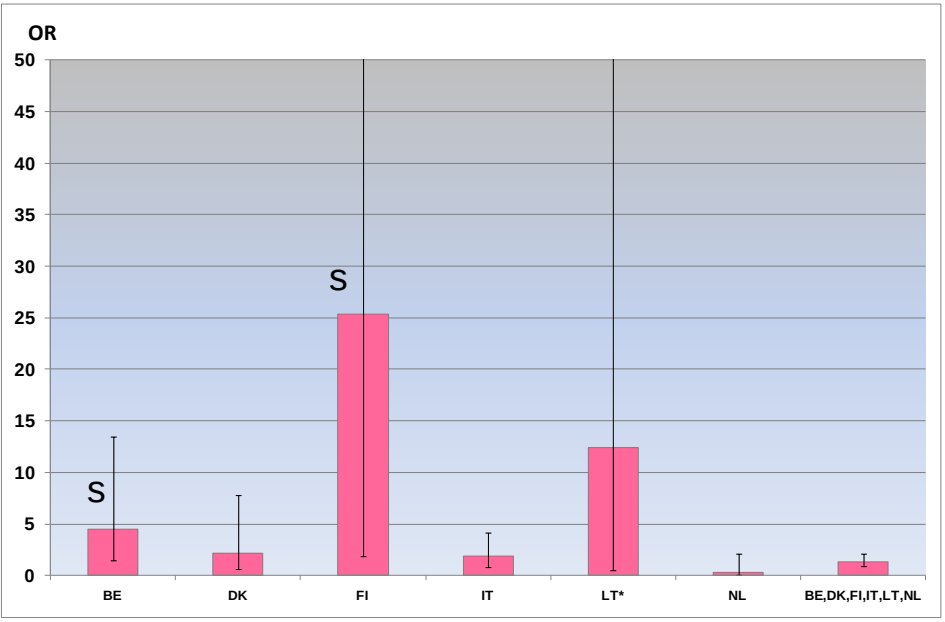
injured ***killed***

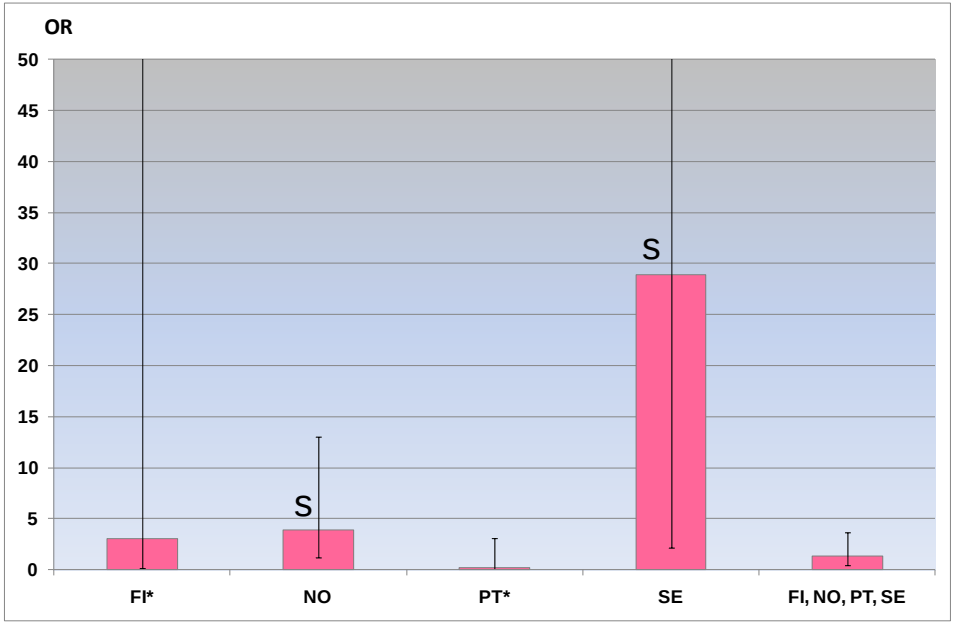
Odds ratios adjusted for gender and age *s: significantly above 1*

** Crude odds ratios*

Because of few positive cases and controls, the aggregated risk estimates of killed and injured drivers positive for cocaine should be handled with care.

Cannabis – risk of getting injured (left) and killed (right)





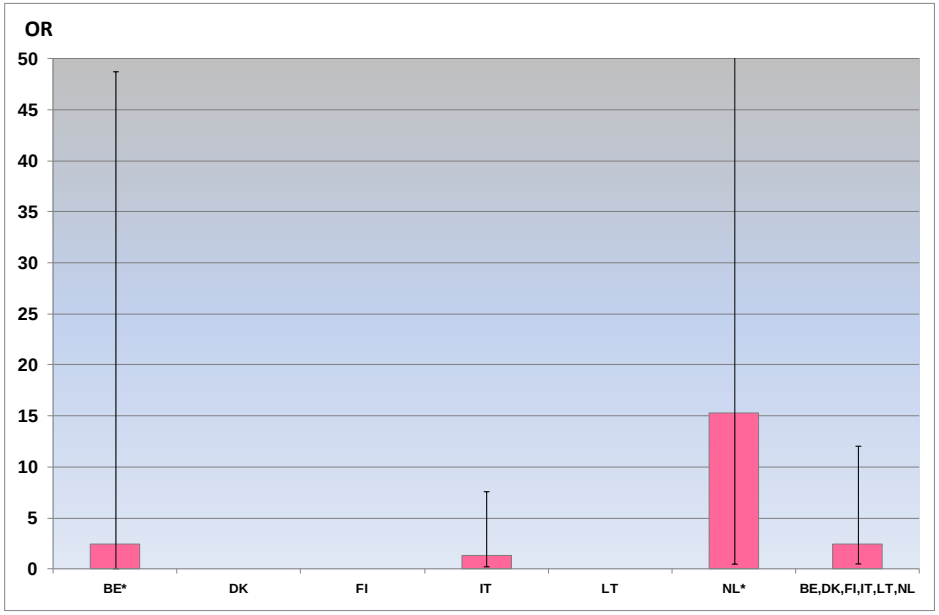
injured ***killed***

Odds ratios adjusted for gender and age *s: significantly above 1*

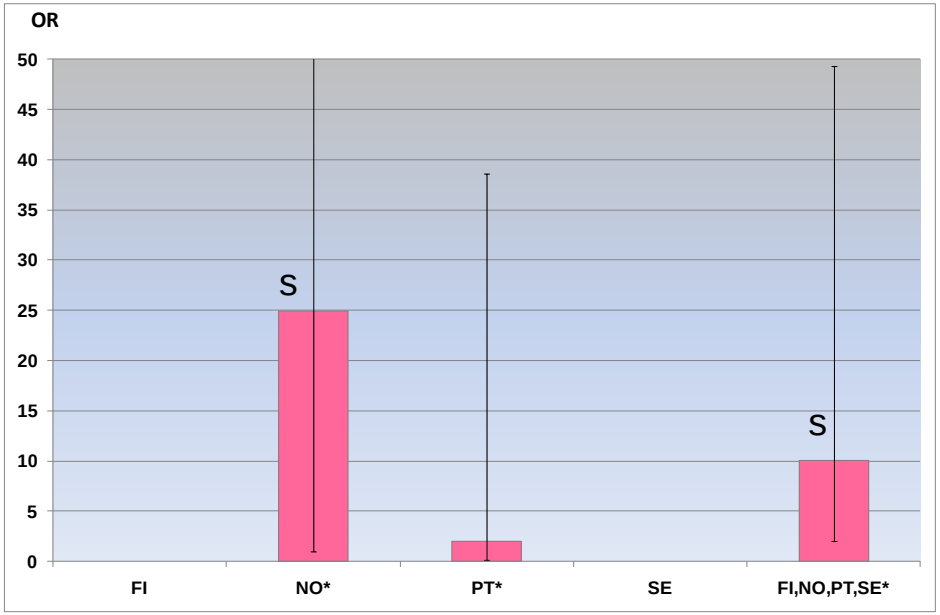
** Crude odds ratios*

Because of very different single country estimates, the aggregated risk estimates of killed drivers positive for cannabis should be handled with care.

Illicit opiates – risk of getting injured (left) and killed (right)



injured



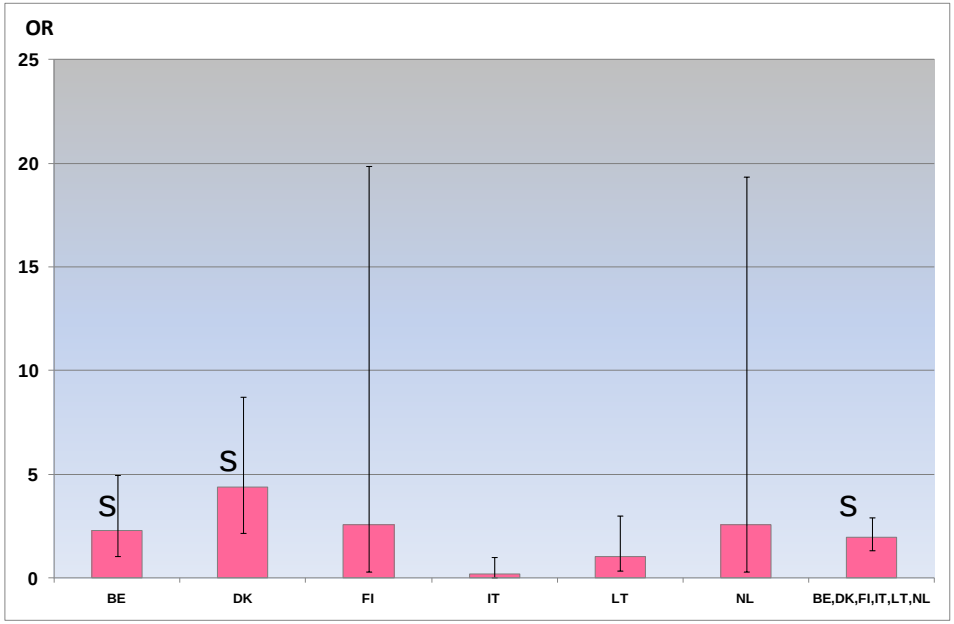
killed

Odds ratios adjusted for gender and age s: significantly above 1

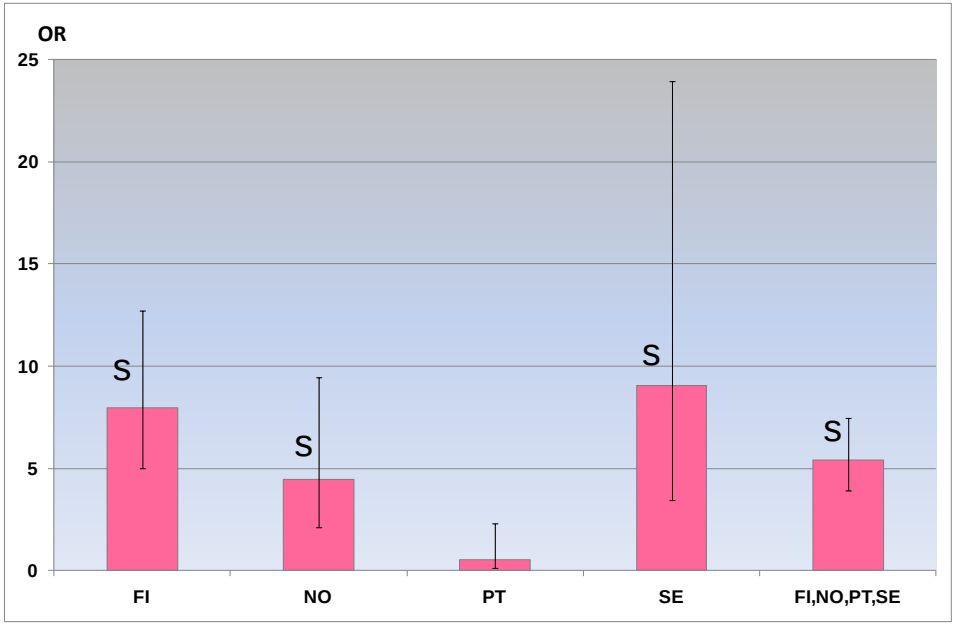
** Crude odds ratios*

Because of few positive cases and controls, the aggregated risk estimates of injured and killed drivers positive for illicit opiates should be handled with care.

Benzodiazepines and z-drugs – risk of getting injured (left) and killed (right)



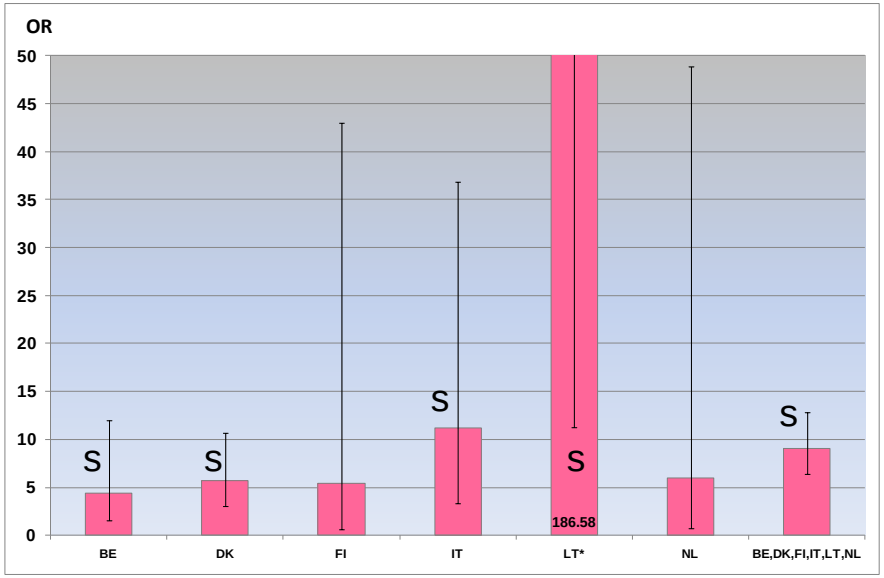
injured



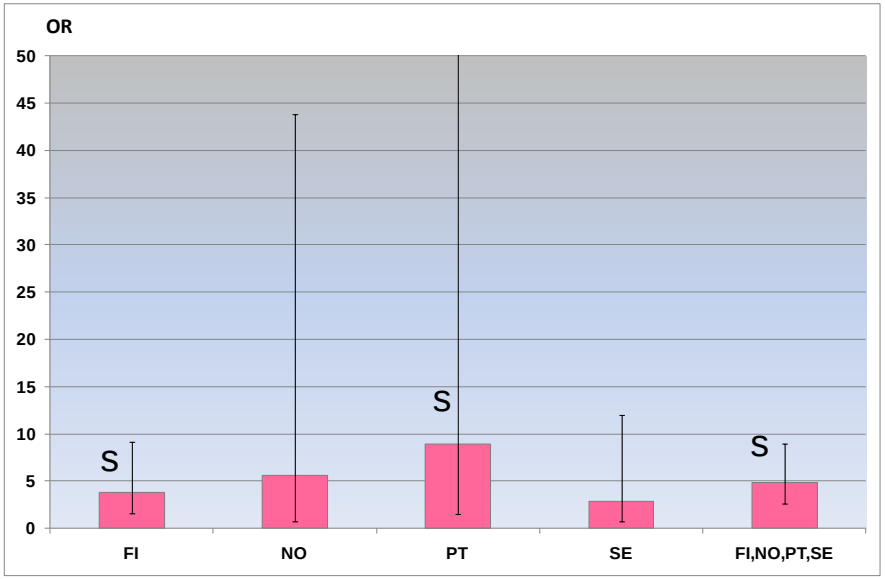
killed

Odds ratios adjusted for gender and age *s: significantly above 1*
** Crude odds ratios*

Medicinal opioids – risk of getting injured (left) and killed (right)



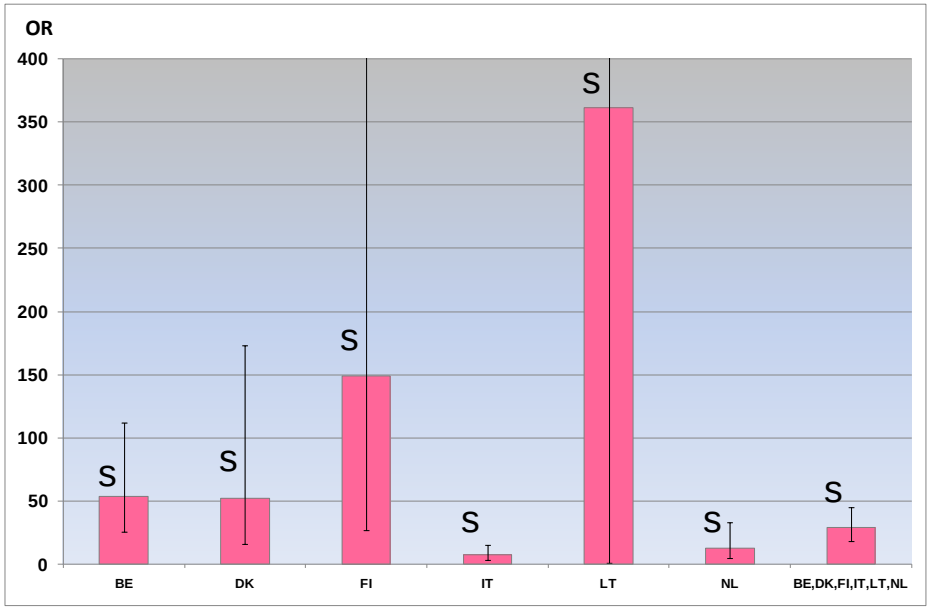
injured

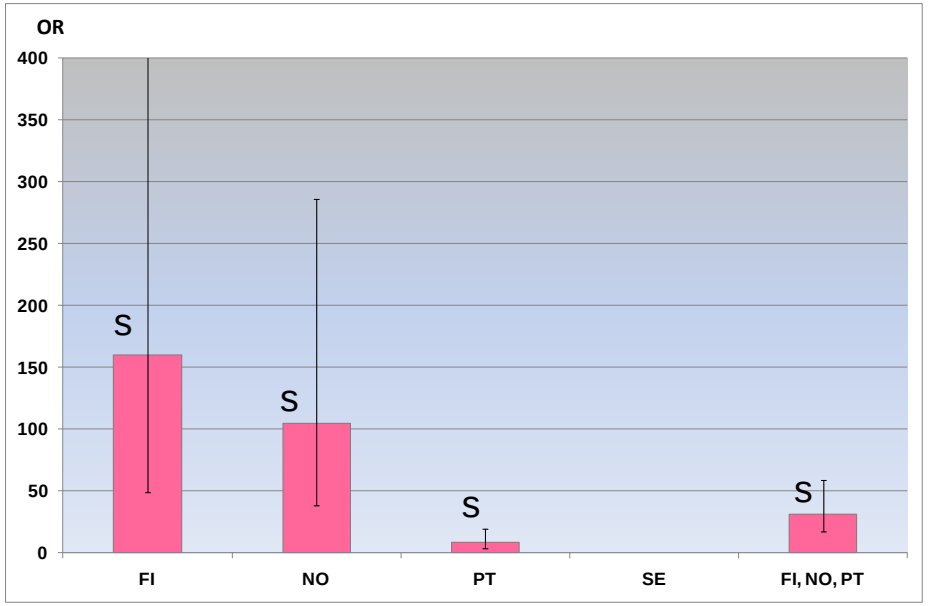


killed

Odds ratios adjusted for gender and age *s: significantly above 1*
** Crude odds ratios*

Alcohol and drug(s) – risk of getting injured (left) and killed (right)



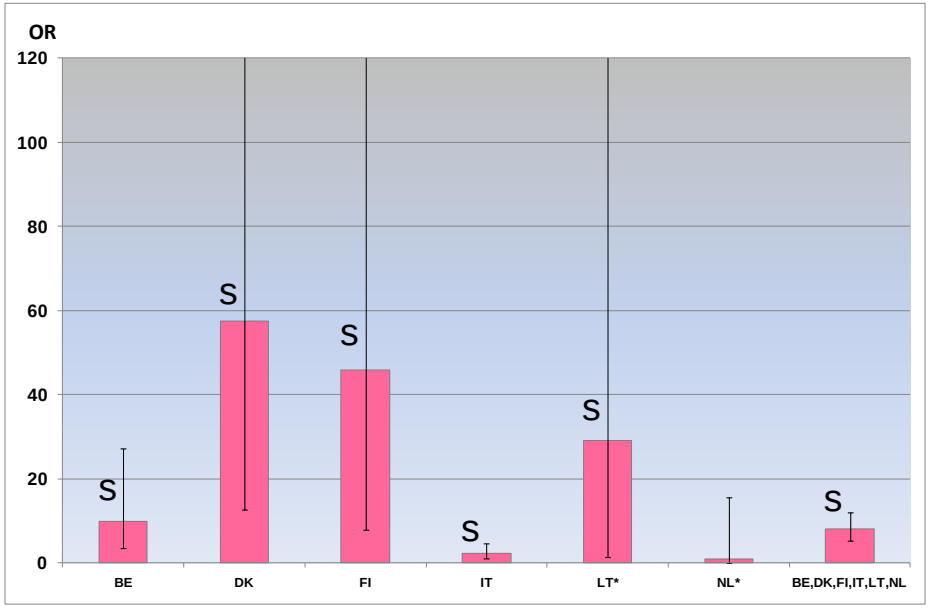


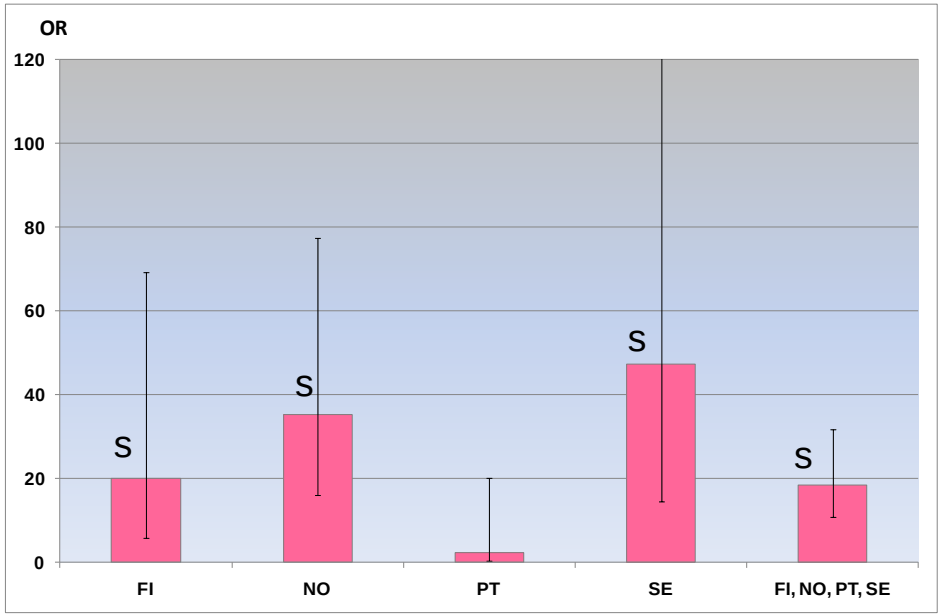
injured *killed*

Odds ratios adjusted for gender and age *s: significantly above 1*

** Crude odds ratios*

Drugs and other drugs – risk of getting injured (left) and killed (right)

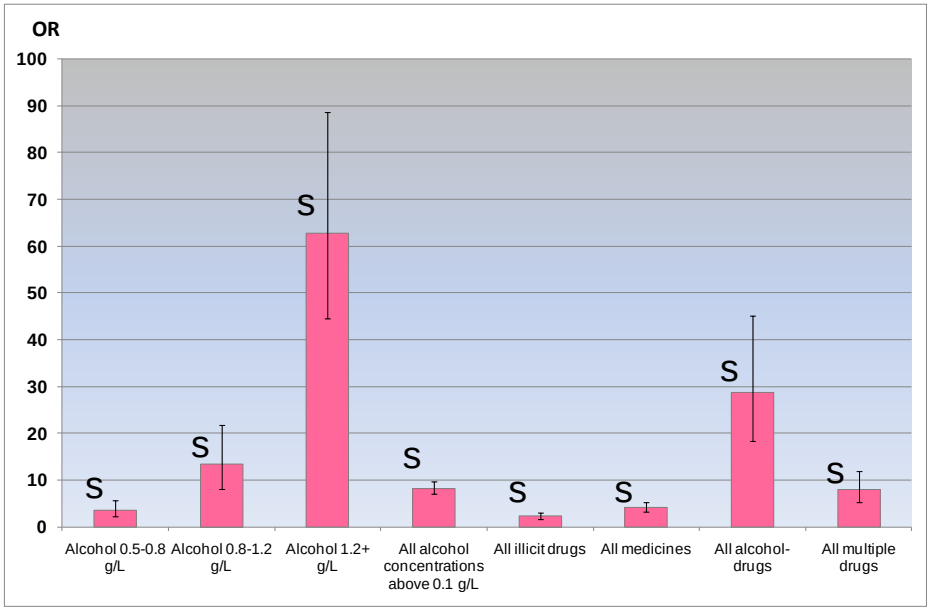




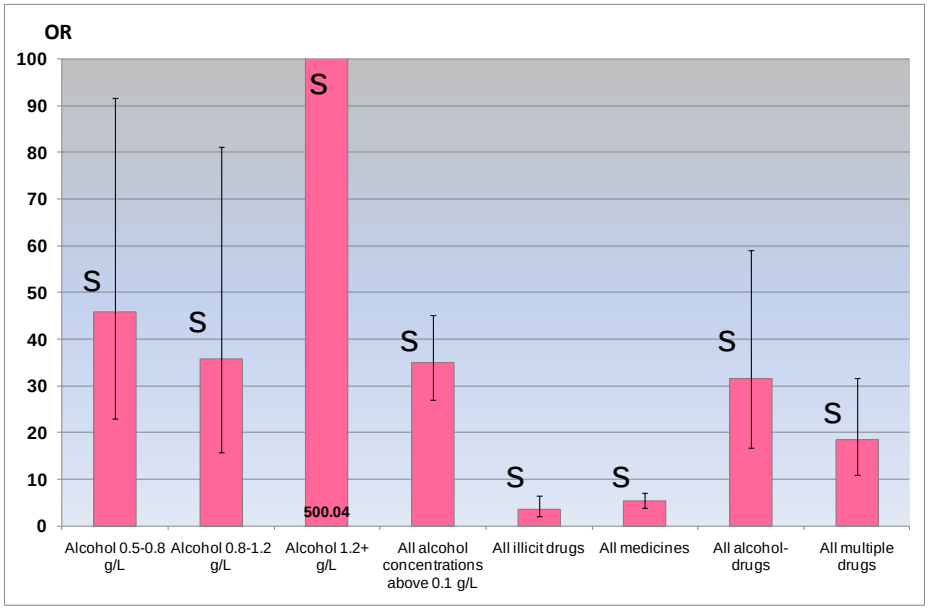
injured ***killed***

Odds ratios adjusted for gender and age *s: significantly above 1*
** Crude odds ratios*

Drugs in groups – risk of getting injured (left) and killed (right)



injured



killed

Odds ratios adjusted for gender and age

s: significantly above 1

Overall conclusion

Risk level	Risk	Substance group
Slightly increased risk	1-3	0.1 g/L ≤ alcohol in blood < 0.5 g/L Cannabis
Medium increased risk	2-10	0.5 g/L ≤ alcohol in blood < 0.8 g/L Benzoylecgonine Cocaine Illicit opiates Benzodiazepines and Z-drugs Medicinal opioids
Highly increased risk	5-30	0.8 g/L ≤ alcohol in blood < 1.2 g/L Amphetamines Multiple drugs
Extremely increased risk	20-200	Alcohol in blood ≥ 1.2 g/L Alcohol in combination with drugs

Cannabis and amphetamines: due to very different single country estimates, the risk estimate must be treated with caution (for amphetamines: see also next slide)
Benzoylecgonine, cocaine and illicit opiates: due to few positive cases and controls, the risk estimates must be treated with caution

Note on amphetamine risk

The risk of getting killed or injured when driving positive for amphetamines is assessed by the epidemiological study to be highly increased (5-30). This is very different from the outcome of the DRUID experimental studies where a significantly elevated risk was not indicated.

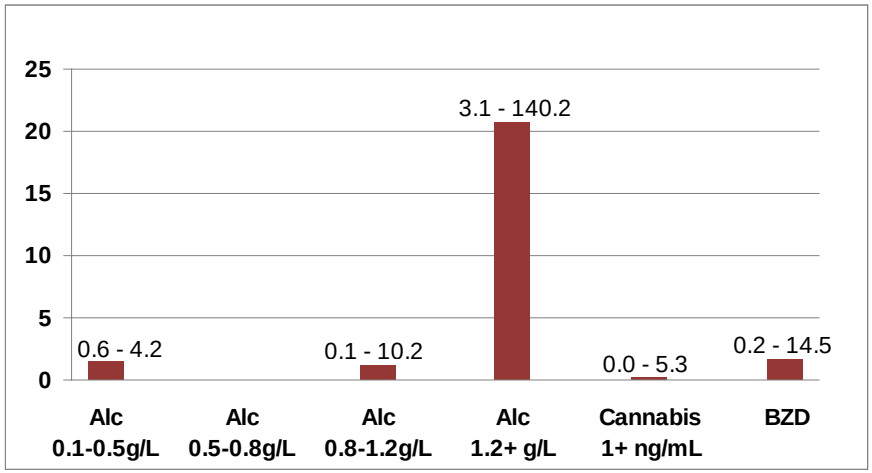
This rather substantial difference in outcome may primarily be caused by two factors:

1) In the DRUID studies of injured or killed drivers where amphetamine was found, the median concentrations were very high, i.e. 102 and 420 ng/mL respectively, with maximum concentrations of 1095 and 120000 ng/mL. For methamphetamine in injured and killed drivers, the median concentrations were 125 and 411 ng/mL, respectively, and maximum concentrations were 240 and 2939 ng/mL (Isalberti et al, DRUID D2.2.5 report). High concentrations of amphetamine may have harmful effects on self-perception, critical judgement and risk taking, while when the stimulating effects are disappearing, a period associated with fatigue, anxiety and irritability may occur. The risk for involvement in traffic accidents might be increased both during the stimulated and fatigue periods when taking high doses .

2) In the epidemiological study, it is not a random sample of drivers who choose to drive positive for (large concentrations of) amphetamines. Probably those who do are more risk taking than the average road user as opposed to the experiments where test persons were 'healthy volunteers'

Relative risk studies

Risk of accident responsibility



Responsible killed drivers in Germany, Lithuania, Hungary, Slovakia

Responsible drivers in fatal accidents in France